

LINE DRIVE



Fermilab Series
of Linear Collider
Double-Headers



US. Linear Collider Site Studies

Vic Kuchler



US Linear Collider Site Studies

- Overview of Initial Site Investigation Efforts
- Additional Site Options Based on More Refined Site Criteria and Investigation
- Present Status for Snowmass '01
- Current Plans for Future Effort



Brief Overview of Effort to Date

- The initial Site Study effort began at SLAC in 1996
- In 1998 a Conventional Facilities Group was formed at SLAC to work on the Linear Collider effort
- A Similar Group at Fermilab joined the collaborative effort in 1999
- The Site Study effort has focused on identifying “representative sites” that would investigate several different geologic conditions and construction techniques
- Current Site Investigations can be applied to any of the Linear Collider Technologies currently under consideration



What is a Representative Site ?

- Investigates Different Geological Conditions
- Investigates Different Construction Techniques
- Investigates Different Support Facility Requirements
- Provides Ample Utility Support (Power and Water)
- Supports Overall Scale of Machine Layout Requirements
- Initially Explore Widely Different Options, Conditions and Methods of Construction – This Will Provide the Opportunity to Develop an Optimized Combination of the Best Options Available as the Design Progresses



What Has Not Yet Been Addressed ?

- Selection of One or More Specific Sites
- Political and Social Implications
- Issues Land Ownership, Acquisition, Easements and Current Usage
- Availability and Procurement Issues
- Site Specific Geological Investigation
- Definitive Ground Motion Constraints

California-Illinois Site Studies (SLAC/FNAL)



UNITED STATES SITE PLAN

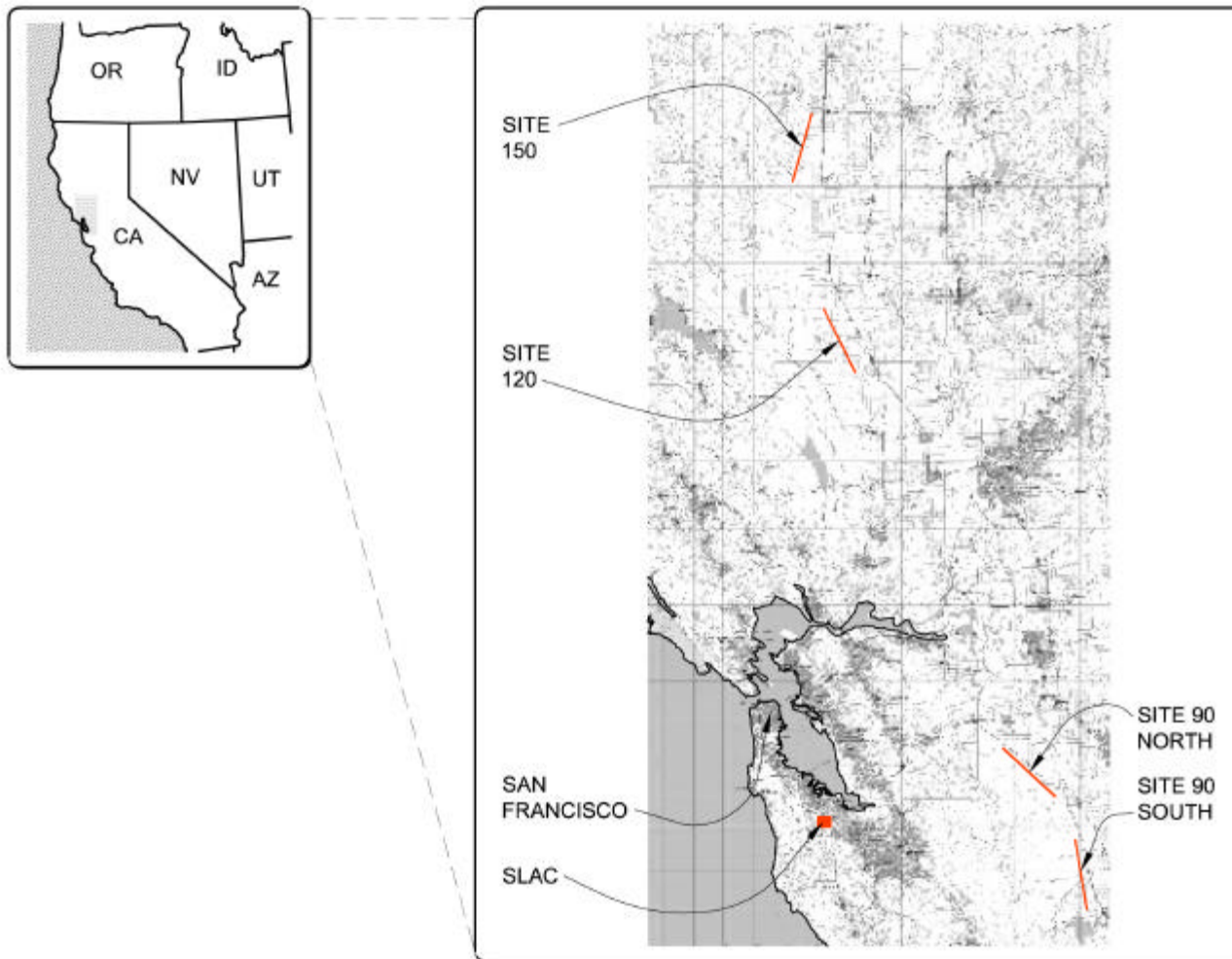
NOT TO SCALE



Initial SLAC Site Investigation

- Sites Identified as 90 North, 90 South, 120 and 150
- Based on the Following Criteria:
 - Proximity to Existing California Laboratories
 - Adjacent to North-South Power Corridor
 - Adjacent to California Water Aqueduct System
 - Consistent California Sandstone Geology
 - Geologically Quiet, Non-Urban Location

Early California Site Studies



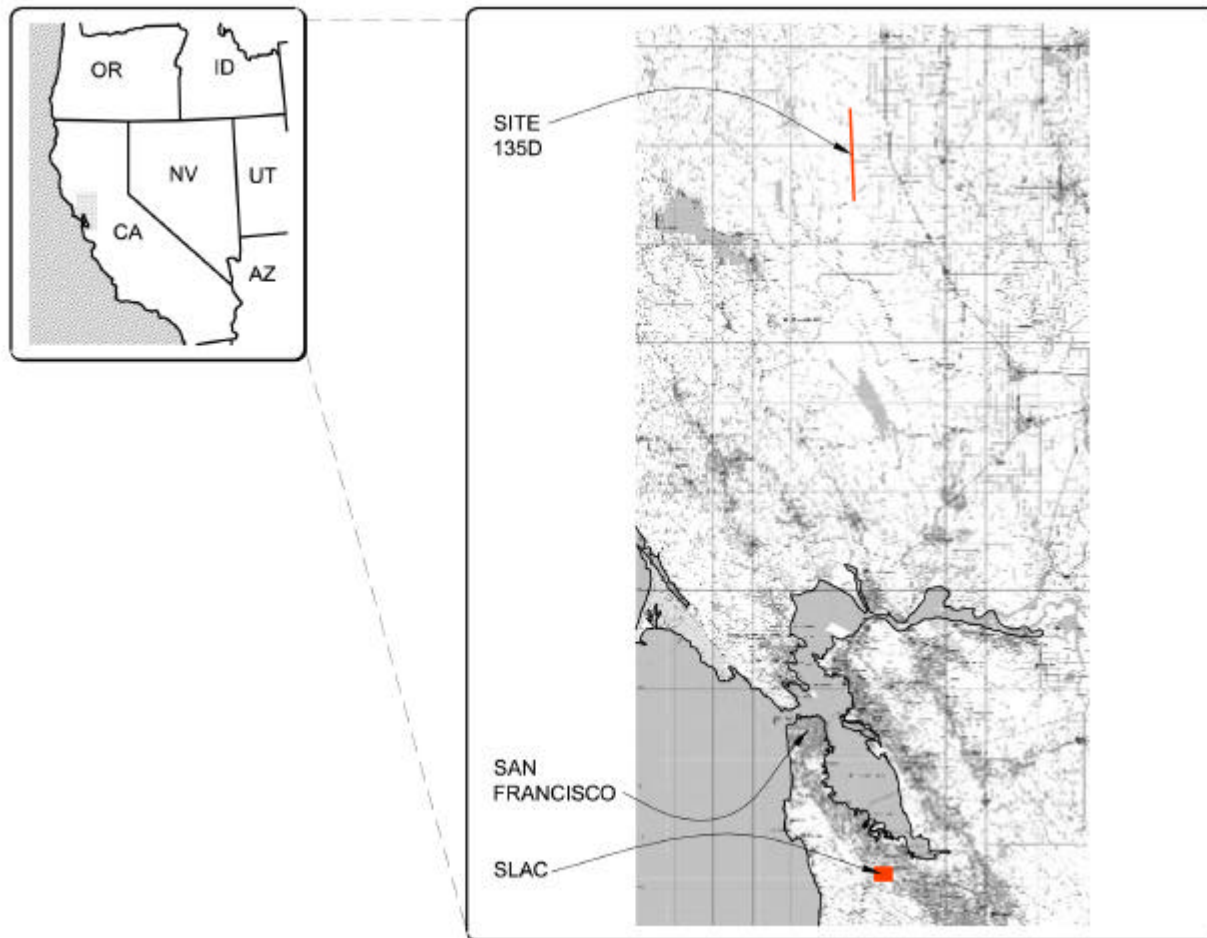


Subsequent SLAC Site Investigation

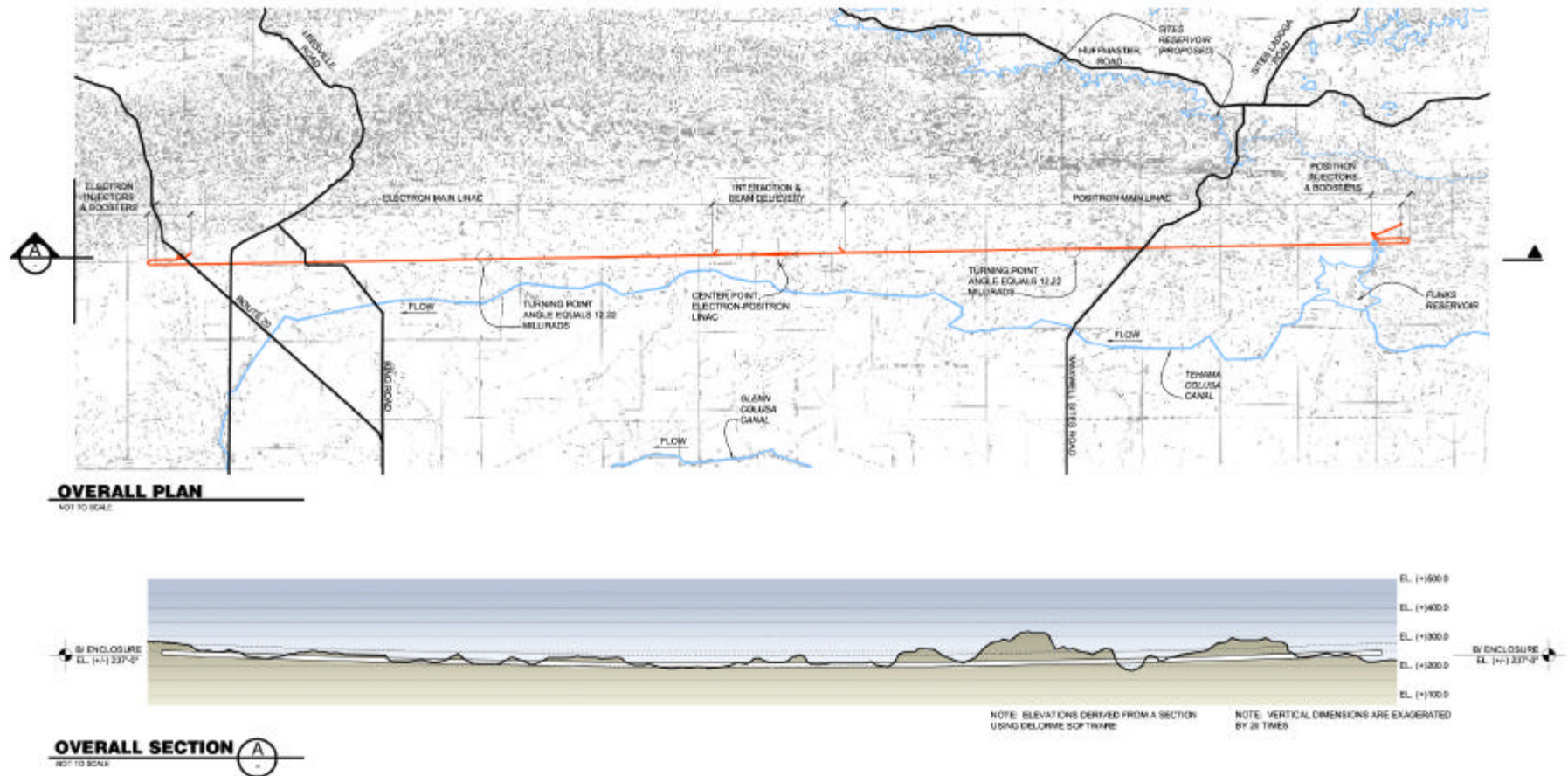
- Sites Identified as 135a, b, c and d
- Based on the Following Additional Criteria:
 - A More Rigorous Visual Site Investigation
 - Geological Consultant Support and Geotechnical Review
 - Refinement of Alignment Criteria
- Cut and Cover/Cut and Fill Construction Method
- Laser Straight Alignment
- Horizontal Access and Egress
- Remote Injection to Main Linacs
- Substantial Land Acquisition Required
- Potential for Hydroelectric Support



FY'00 California Site Study



California - Site135D



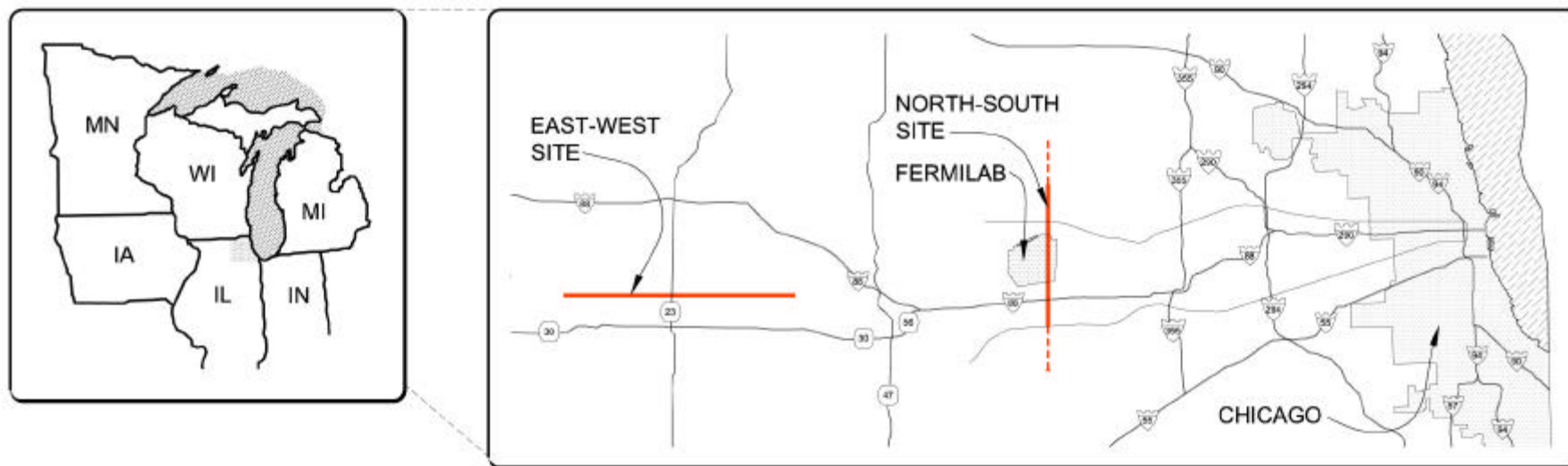


California Site Photos





Picture of Northern Illinois

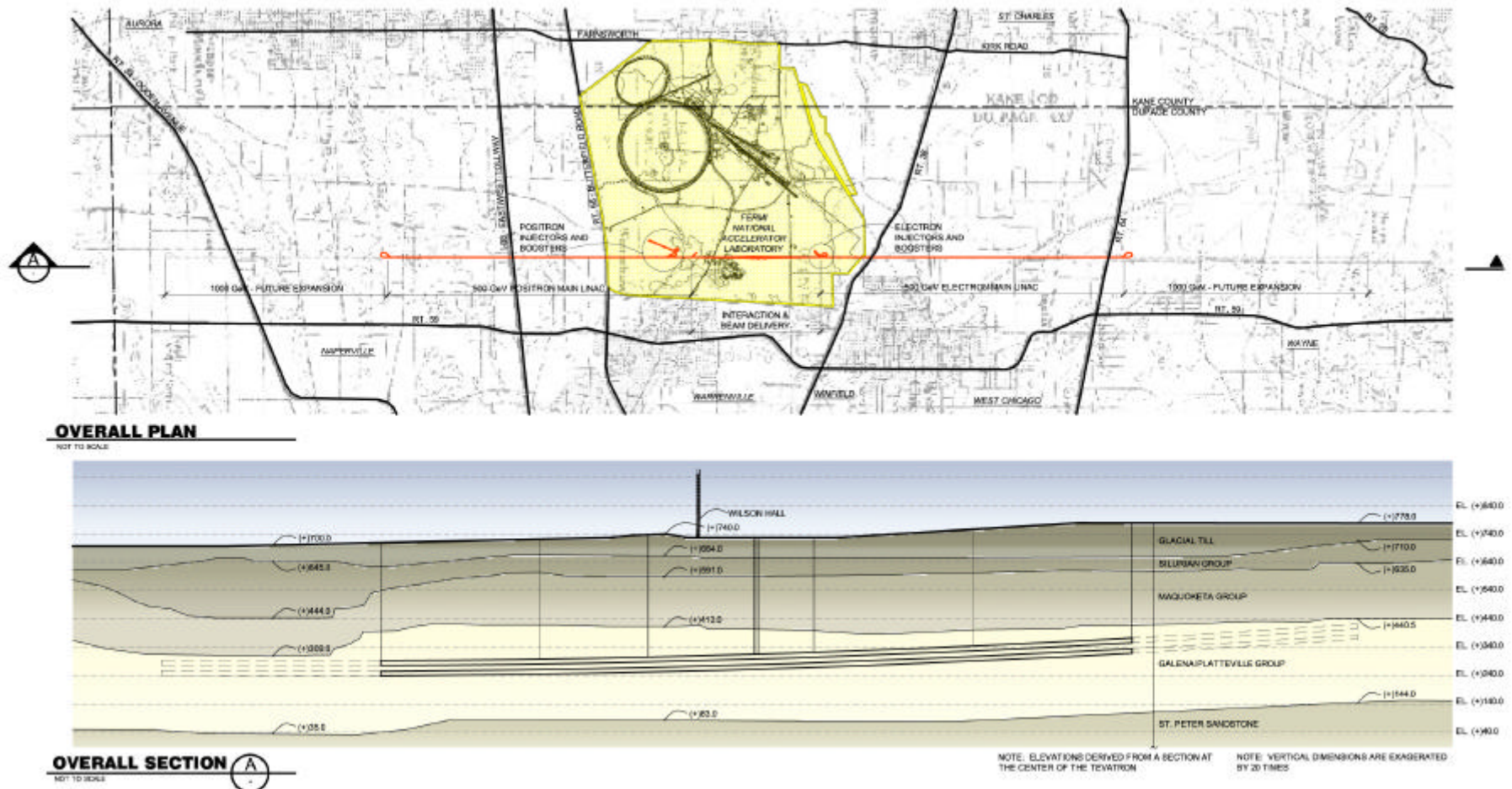




Initial Fermilab Site Investigation - North-South Site -

- Maximize Use of Existing Fermilab Facilities
- Central Injection into Main Linacs with Potential for Reduced Initial Tunnel Costs
- Centralized Cooling Plant
- Centralized Electrical Power Supply
- Parallel Deep Tunnel Construction in Galena/Platteville Strata for Beam Enclosure and Klystron Support Galleries
- Equipment Access Shafts on Fermilab Site
- Two Personnel Access Shafts and Two Ventilation Shafts Located off the Fermilab Site
- Laser Straight Alignment
- Minimized Land Acquisition Requirements Off-Site

Illinois – North-South Site





Illinois North-South Site Photos

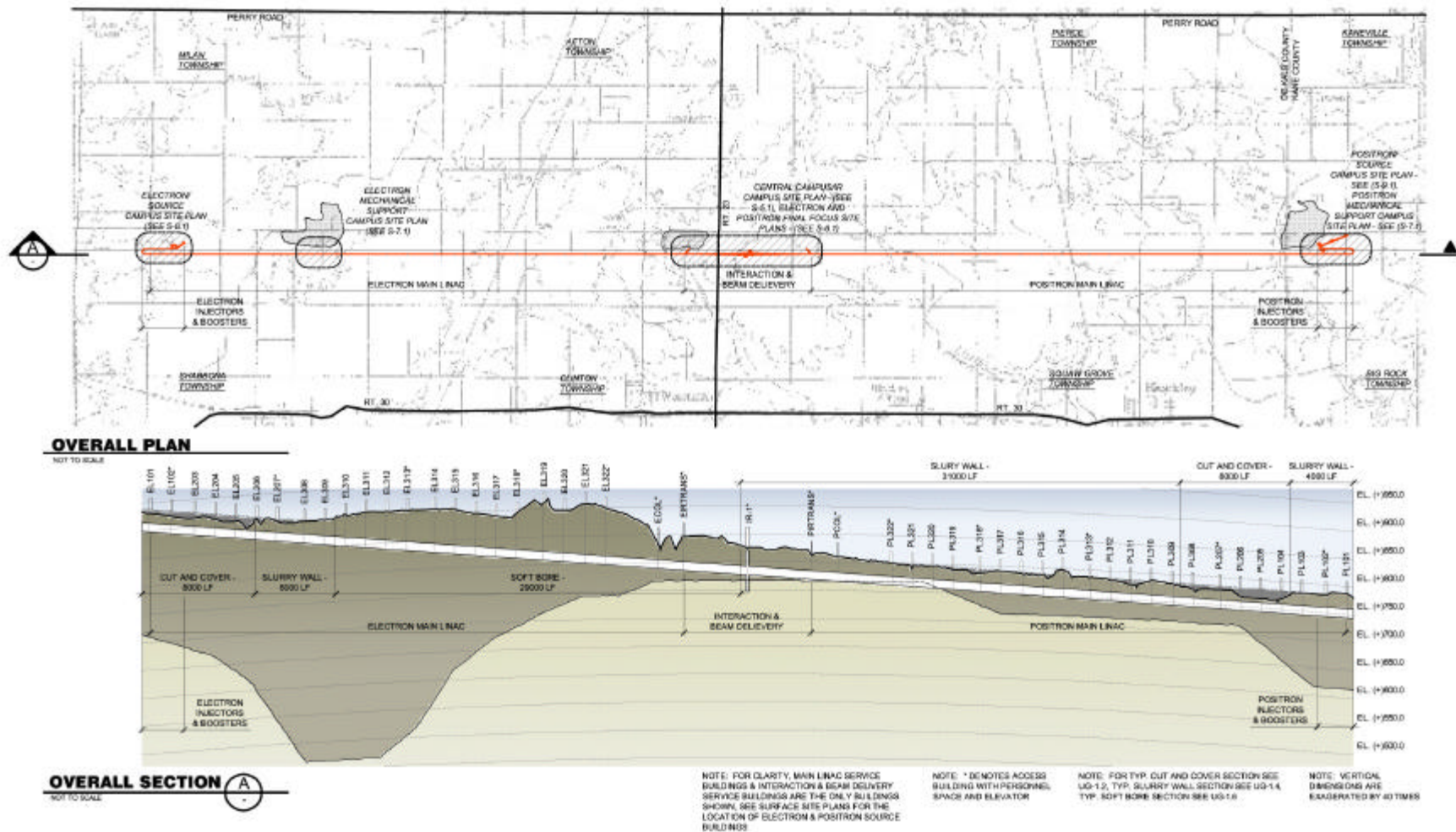




Initial Fermilab Site Investigation - East-West Site -

- Modest Reuse of Existing Fermilab Facilities
- Remote Injection to Main Linacs
- Distributed Cooling Capacity
- Distributed Electrical Power Supply
- Cut and Cover Construction in Glacial Till Material
- Grade Level Support Galleries with Enclosure Below
- Laser Straight Alignment
- Substantial Land Acquisition Required

Illinois – East-West Site





Illinois East-West Site Photos





Current Snowmass Configuration

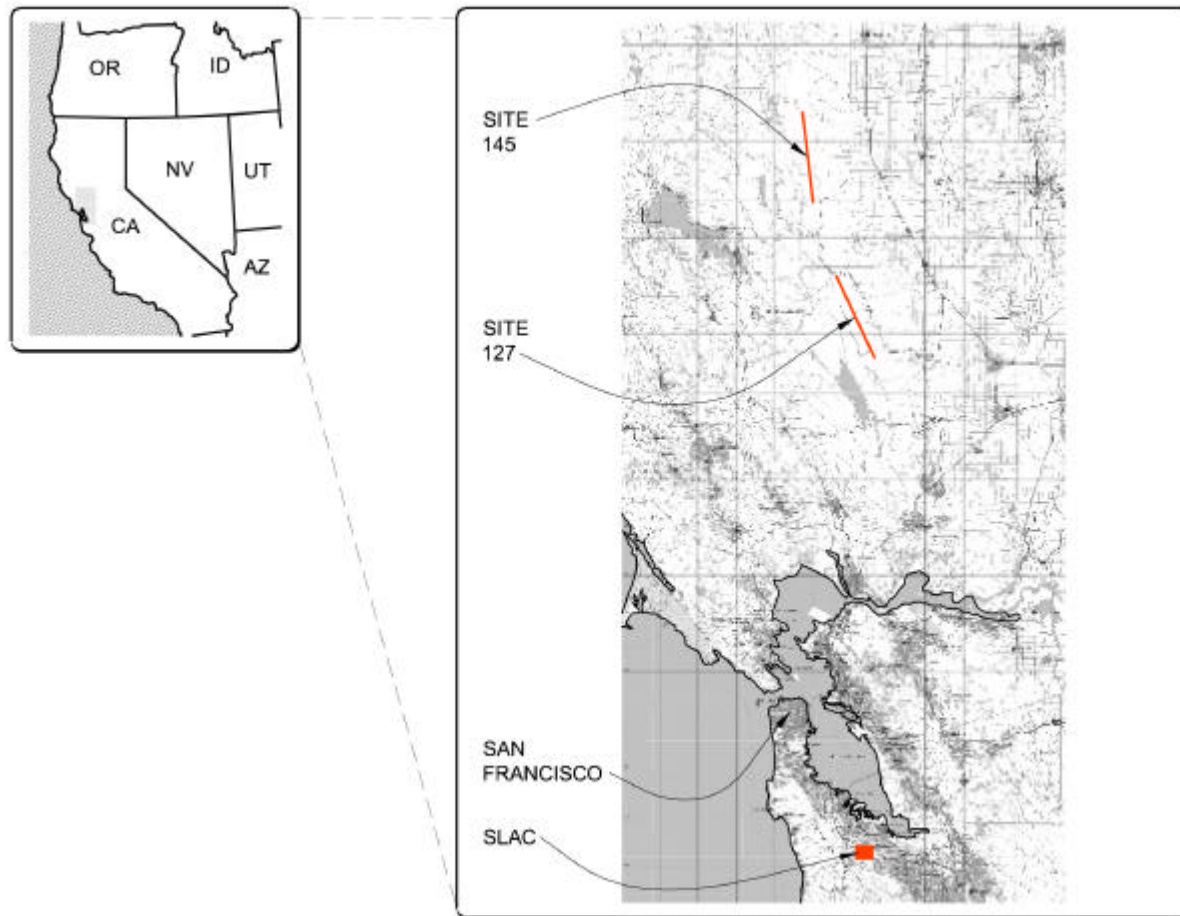
- SLAC Site 135d
 - Remote Injection
 - Cut and Cover/Cut and Fill Construction
- Fermilab North-South Site
 - Central Injection
 - Deep Tunnel Construction
- Standard for Both Sites
 - Laser Straight Configuration
 - Design and Cost Estimates Supported by Local Experience and Expertise



Where Do We Go From Here ?

- Explore New SLAC 127 and 145 Sites
 - Possibly More Promising Geologically
 - Explore Shallow Bored Tunnel Construction Technique
 - Maintain Horizontal Access
 - Investigate Impacts of Laser Straight or Terrain Following Alignment
- Iterate Design for Fermilab North-South Site
 - Explore Impact of Tunnel in Upper Rock Strata Based on NuMI Construction Experience
 - Investigate Grade Level Central Injection Configuration

Future California Site Studies





Work Is Still Needed

- Ground Motion Requirements
- Consistent Requirements for Support Facilities
- Definitive Understanding of Geologic Conditions and Their Impact on Construction Technique and Cost
- Issues of Land Acquisition and Easement Rights